Applicants submits that Claims 9, 16, and 21 have each been amended to the recite the steps of dissolving gamma-prime particles having a first particle size and growing additional gamma-prime particles in the rigid die insert, wherein each of the additional gamma-prime particles has a second particle size, *that is smaller than the first particle size*, and that "smaller particle size" has been deleted from Claim 14. Applicants submit that the amended claims now distinctly claim that the second particle size is smaller than the first particle size and that the rejection of Claims 9, 14, 16, and 21, and the claims dependent thereon, under 35 U.S.C. §112, second paragraph, is therefore successfully overcome.

The Examiner has also rejected Claims 10, 14, 16, and 21 under 35 U.S.C. §112, second paragraph, as being indefinite. The Examiner states that the term "predetermined" fails to define the novel claimed hold time, and that the phrase "first predetermined temperature" is superfluous.

Applicants submit that the requirements of 35 U.S.C. §112, second paragraph, are met by the claims, as one of ordinary skill in the art would understand the plain meaning of the term "predetermined" to be "to decide in advance." In the context of the present invention, one of ordinary skill in the art would understand a "predetermined hold time" to be a hold time whose length is decided upon prior to beginning a holding period at a temperature, rather than on an *ad hoc* basis. Similarly, one of ordinary skill in the art would understand a "predetermined temperature" to be a temperature that has been decided upon prior to heating, rather than on an *ad hoc* basis. Applicants submit that, because these terms are clear to one of ordinary skill in the art, the rejection of Claims 10, 14, 16, and 21 under 35 U.S.C. §112, second paragraph, is successfully overcome.

Rejections under 35 U.S.C. §103(a)

Claims 9-15 and 21-25 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Gravemann (U.S. Patent 4,702,299) in view of Tillman et al. (U.S. Patent 5,328,659) or Blackburn et al. (U.S. Patent 4,820,356).

Applicants submit that, in order to establish a *prima facie* case of obviousness, the references must teach or suggest all of the claimed limitations of the present invention. The requisite suggestion or motivation must come from the references themselves, rather than from the Applicants' specification. Obviousness cannot be established by locating references which describe various aspects of a patent applicant's invention without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done.

With respect to Claims 9-15 and 21-25, Applicants submit that the combinations of references cited by the Examiner neither teach nor suggest a method of treating a rigid die insert to reduce crack propagation and raise yield stress therein. Gravemann teaches mold inserts to avoid strong friction and reduce wear, *not* to reduce crack propagation. See for example, column 3, line 59, to column 4, line 2, of the reference. Both Tillman et al. and Blackburn et al. do not teach a method of treating a die insert, but instead teach heat treatment of turbine components, particularly turbine disks, that are formed from superalloys. See Tillman et al., column 1,line 13-41; and Blackburn et al., column 1, line 10-30.

In item 10 of the June 20 Office Action, the Examiner states: "The high temperature crack is also a problem for mold/die materials." Applicants submit that the Examiner has not come forth with facts to support this assertion. MPEP §2144.03 clearly states:

> "When a rejection is based on facts within the personal knowledge of the examiner, the data should be stated as specifically as possible, and *the facts must be supported* (emphasis added) when called for by the applicant... ('[A]ssertions of technical facts in areas of esoteric technology *must always be supported by citation of some reference work" and "allegations concerning specific 'knowledge' of the prior art, which might be peculiar to a particular art should also be supported.* (emphasis added)' Furthermore the applicant must be given the opportunity to challenge the correctness of such assertions and allegations. The facts so

noticed serve to "fill the gaps" which might exist in the evidentiary showing' and should not comprise the principle evidence upon which a rejection is based.)"

Applicants submit that the Examiner has failed to provide the required support for this assertion regarding high temperature cracking in molds, and hereby invite the Examiner to come forth with such support.

Applicants further submit that, because none of the references cited teach or suggest a method of treating a rigid die insert to reduce crack propagation, the Examiner has apparently relied upon the Applicants' own disclosure of a such a method to provide the teaching necessary to establish a *prima facie* case of obviousness. Thus, Applicants submit that the Examiner has used improper hindsight analysis to reject the claims.

Applicants also submit that there is no suggestion or motivation to combine the heat treatments of either Tillman et al. or Blackman et al. with the die inserts of Gravemann. As previously presented, the die insert of Gravemann is designed to prevent wear, *not* to prevent crack propagation. In addition, the superalloy turbine disks of both Tillman et al. and Blackman et al. are subject to high rotational speeds, other cyclic stresses, and are located in high velocity hot gas paths. See Tillman et al., column 1, lines 20-30; and Blackman et al., column 1, lines 19-30. In contrast to turbine disks, the die and die inserts of Gravemann are fixed structures that are not subjected to the multiple stresses experienced by turbine disks. Applicants therefore submit that one of ordinary skill in the art would not be motivated to use the heat treatment of articles that rotate at high speeds to heat treat a static die insert that is *not* exposed to such dynamic stresses.

Applicants submit that the combination of references cited by the Examiner neither teach nor suggest a method of treating a rigid die insert by heating the die insert in an inert gas atmosphere. Gravemann, Tillman et al., and Blackburn et al. contain no reference whatsoever to heating a die insert in an inert gas atmosphere.

In item 13 of the June 20 Office Action, the Examiner states: "Using inert gas during heat treatment during heat treatment is conventional and it is contemplated within

the ambit of ordinary skill in the artisan to protect heating from oxidized." Applicants submit that the Examiner has not come forth with facts to support this assertion as required by MPEP §2144.03 (quoted above). Applicants submit that the Examiner has failed to provide the required support for the assertion regarding the use of inert gas during heat treatment, and hereby invite the Examiner to come forth with such support.

Applicants further submit that, because none of the references cited teach or suggest a method of treating a rigid die insert by heating the die insert in an inert gas atmosphere, the Examiner has apparently relied upon the Applicants' own disclosure of such a method to provide the teaching necessary to establish a *prima facie* case of obviousness. Thus, Applicants submit that the Examiner has used improper hindsight analysis to reject the claims.

Moreover, Applicants submit that, if using inert gas during heat treatment is "conventional and is contemplated within the ambit of ordinary skill," it is noteworthy that none of the references teach or suggest its use. The absence of such a teaching is evidence that the references as a whole teach away from the use of inert gas in the heat treatment of rigid die inserts.

Applicants also submit that the references neither teach nor suggest obtaining a uniform size distribution of gamma-prime particles, as claimed in Claims 9, 16, and 21, and described in paragraph 18, found on page 5 of the specification. Applicants submit that Tillman et al. teach away from a uniform size distribution. The reference instead teaches multiple size distributions of gamma-prime particles. The reference, in column 4, lines 13-15, teaches that heat treatment results in "a distinctive triplex gamma prime size distribution." That Tillman et al. teach that a triplex size distribution is obtained by heat treatment also demonstrates that heat treatment does not inherently result in a uniform size distribution of gamma-prime particles. Gravemann and Blackburn et al. are silent as to size distribution of gamma-prime particles.

Applicants therefore submit that, because the combination of Gravemann with either Tillman et al. or Blackburn et al. fail to teach or suggest all of the claimed

limitations of the present invention, the rejection of Claims 9-15 and 21-25 under 35 U.S.C. §103(a) as being unpatentable over these references is successfully overcome.

Claims 16-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Tillman et al. or Blackburn et al.

Applicants submit that the references cited by the Examiner neither teach nor suggest a method of treating a rigid die insert by heating the die insert in an inert gas atmosphere. Neither Tillman et al., nor Blackburn et al. contain any reference whatsoever to heating a die insert in an inert gas atmosphere.

As presented above, the Examiner states: "Using inert gas during heat treatment during heat treatment is conventional and it is contemplated within the ambit of ordinary skill in the artisan to protect heating from oxidized." As previously presented, Applicants submit that the Examiner has not come forth with facts to support this assertion as required by MPEP §2144.03 (quoted above). Applicants submit that the Examiner has failed to provide the required support for the assertion regarding the use of inert gas during heat treatment, and hereby invite the Examiner to come forth with such support.

Applicants further submit that, because none of the references cited teach or suggest a method of treating a rigid die insert by heating the die insert in an inert gas atmosphere, the Examiner has apparently relied upon the Applicants' own disclosure of such a method to provide the teaching necessary to establish a *prima facie* case of obviousness. Thus, Applicants submit that the Examiner has used improper hindsight analysis to reject the claims.

Applicants submit that, as presented above, the references neither teach nor suggest obtaining a uniform size distribution of gamma-prime particles, as claimed in Claims 9, 16, and 21, and described in paragraph 18 of the specification. Applicants submit that Tillman et al. teach away from a uniform size distribution. The reference instead teaches multiple size distributions of gamma-prime particles. The reference, in column 4, lines 13-15, teaches that heat treatment results in "a distinctive triplex gamma prime size distribution." That Tillman et al. teach that a triplex size distribution is

obtained by heat treatment also demonstrates that heat treatment does not inherently result in a uniform size distribution of gamma-prime particles. Blackburn et al. are silent as to size distribution of gamma-prime particles.

Applicants therefore submit that, because neither Tillman et al. nor Blackburn et al. teach or suggest all of the claimed limitations of the present invention, the rejection of Claims 16-20 under 35 U.S.C. §103(a) as being unpatentable over these references is successfully overcome.

In light of the amendment and remarks presented herein, Applicants submit that the case is in condition for immediate allowance and respectfully request such action. If, however, any issues remain unresolved, the Examiner is invited to telephone the Applicants' counsel at the number provided below.

Respectfully submitted,

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September 20, 2002

ATTACHMENT A

Marked-up versions of amended Claims 9, 11-14, 16, 18, 19, 21, and 24 are provided below.

Marked-up version of Claim 9:

9. (Amended) A method of treating a rigid die insert to reduce crack propagation and raise yield stress therein, the rigid die insert comprising a nickel-base superalloy having a plurality of gamma-prime particles, each of the gamma-prime particles having a particle size, the method comprising the steps of:

a) providing the rigid die insert;

b) dissolving [larger] gamma-prime particles having a first particle size [in the rigid die insert] by:

i) heat treating the rigid die insert in an inert atmosphere to a first predetermined temperature for a first predetermined hold time, the first predetermined temperature being a sub-solvus temperature of the nickel-base alloy; and

ii) quenching the rigid die insert to room temperature in a room temperature bath; and

c) growing additional gamma-prime particles [of smaller particle size] in the rigid die insert, wherein each of the additional gamma-prime particles has a second particle size, the second particle size being smaller than the first particle size,

[whereby] wherein the particle size of each of the plurality of gamma-prime particles is refined to produce a uniform size distribution of the gamma-prime particles, thereby reducing crack propagation and raising the yield stress of the rigid die insert.

Marked-up version of Claim 11:

11. (Amended) The method of Claim [10]9, further including the step of forced-air cooling the rigid die insert after the step of heat treating the rigid die insert to a first predetermined temperature.

Marked-up version of Claim 12:

12. (Amended) The method of Claim [10]9, wherein the inert atmosphere is an argon atmosphere.

Marked-up version of Claim 13:

13. (Amended) The method of Claim [10]9, wherein the step of quenching the rigid die insert to room temperature in a room temperature bath comprises quenching the rigid die insert to room temperature in a room temperature oil bath.

Marked-up version of Claim 14:

14. (Amended) The method of Claim 9, wherein the step of growing additional gamma-prime particles [of smaller particle size] in the rigid die insert comprises aging the rigid die insert in an inert atmosphere [to] at a second predetermined temperature for a second predetermined hold time.

Marked-up version of Claim 16:

16. (Amended) A method of refining the particle size of gamma-prime particles in a Rene 95 superalloy, the method comprising the steps of:

a) providing a Rene 95 superalloy;

b) heating the Rene 95 superalloy in an inert atmosphere to a first temperature, th first temperature being a temperature below a solvus temperature of the Rene 95 superalloy;

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c) quenching the Rene 95 superalloy [at] to room temperature in a bath, thereby dissolving [larger] gamma-prime particles, in the Rene-95 superalloy, wherein each of the gamma-prime particles has a first particle size; and

d) aging the Rene 95 superalloy after quenching in an inert atmosphere at a second predetermined temperature for a second predetermined hold time, thereby growing additional gamma-prime particles, wherein each of the additional gamma-prime particles has a second [of smaller] particle size that is less that the first particle size, [whereby] and wherein a [more] uniform size distribution of gamma-prime particles is created.

Marked-up version of Claim 18:

18. (Amended) The method of Claim 16, wherein the step of quenching the Rene 95 superalloy [at] to room temperature in a bath comprises quenching the Rene 95 superalloy in a room temperature oil bath.

Marked-up version of Claim 19:

19. (Amended) The method of Claim 16, wherein the step of aging the Rene 95 superalloy in an inert atmosphere at a second predetermined temperature for a second predetermined hold time comprises heating the Rene 95 [into] up to about 1400°F for about 16 hours.

Marked-up version of Claim 21:

21. (Amended) A method of treating a rigid die insert to reduce crack propagation and raise yield stress, the rigid die insert comprising a Rene 95 superalloy having a plurality of gamma-prime particles, each of the gamma-prime particles having a particle size, the method comprising the steps of:

a) providing the rigid die insert;

b) heating the rigid die insert in an inert atmosphere to a first temperature for a first predetermined hold time, the first temperature being a temperature below a solvus temperature of the Rene 95 superalloy;

c) forced-air cooling the rigid die insert;

d) quenching the rigid die insert at room temperature in a bath, thereby dissolving [larger] gamma-prime particles in the Rene-95 superalloy, wherein each of the gamma-prime particles has a first particle size; and

e) aging the rigid die insert in an inert atmosphere at a second predetermined temperature for a second predetermined hold time,

[whereby] wherein the particle size of each of the plurality of gamma-prime particles is refined and a uniform size distribution of gamma-prime particles is created, thereby reducing crack propagation and raising the yield stress of the rigid die insert.

Marked-up version of Claim 24:

24. (Amended) The method of Claim 21, wherein the step of aging the rigid die insert in an inert atmosphere at a second predetermined temperature for a second predetermined hold time comprises heating the rigid die insert [into] up to about 1400°F for about 16 hours.

